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ABSTRACT

This paper is one of a group that describes the research methodology for an evaluation of individually guided education (IGE) in American elementary schools. Described here are the procedures used to select the sample of schools being studied in the first phase of the evaluation. This phase was a large sample study that used structural equations methods to examine relations between certain features of IGE schools and both pupil and staff outcome variables. The document also describes both the population of IGE schools and the sample, thereby providing an objective basis for judging the representativeness of the sample. A sampling procedure based on stratified random sampling was chosen to assure that the sample would reflect the full range of variability of IGE schools with respect to characteristics measured by the IGE Schools Questionnaire of March 1976. However, too few of the randomly selected schools agreed to participate, so it became necessary to request the participation of schools not initially selected. The sampling frame developed for stratified random sampling then was used to gauge how well the participant schools represented the total population despite the dangers of self-selection. A lengthy appendix contains the IGE Schools Questionnaire and tables of stratification variables. (Author/JM)

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Working Paper No. 223

SAMPLING FOR PHASE I OF THE IGE EVALUATION

by

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Report from the Project on
Evaluation of Practices on Individualized Schooling

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ABSTRACT

This document describes the procedures used to select the sample of schools being studied in Phase I of the evaluation of Individually Guided Education (IGE). Phase I of the evaluation is a large sample study that uses structural equations methods to examine relations between certain features of IGE schools and both pupil and staff outcome variables. The document also describes both the population of IGE schools and the sample, thereby providing an objective basis for judging the representativeness of the sample.

A sampling procedure based on stratified random sampling was chosen to assure that the sample would reflect the full range of variability of IGE schools with respect to characteristics measured by the IGE Schools Questionnaire of March 1976. Such a full range of variability is especially important when, as in Phase I, relations between school characteristics are being studied.

Too few of the initially selected schools agreed to participate, so it became necessary to request the participation of those schools that were not initially selected. The sampling frame that was developed for stratified random sampling can be used to gauge how well the participant schools represent the total population, despite the evident dangers of self-selection in the sample.

I

INTRODUCTION

This document describes the procedures used to select the sample for Phase I of the Individually Guided Education (IGE) evaluation. Phase I is a large-sample study, employing group-administered standardized tests and questionnaires. The Phase I study examines the relation between certain features of IGE schools thought to be important and both pupil and staff outcome variables. Those features of IGE schools, including a support system, pupil background, staff background, and means of instruction, have been related by Romberg (1976) in the framework shown in Figure 1.

The purpose of Phase I, together with the other phases of the IGE evaluation, is to gain a more comprehensive view of the system's operation and effectiveness. The basic objective of the IGE evaluation is to identify features of IGE schooling that contribute to the success of reading and mathematics instruction. That includes the following objectives:

1. To provide basic information about Individually Guided Education. A functional understanding of IGE features, processes, and outcomes requires that a broad range of related variables be interpreted.
2. To clarify the extent to which IGE has resulted in educational reform and renewal.

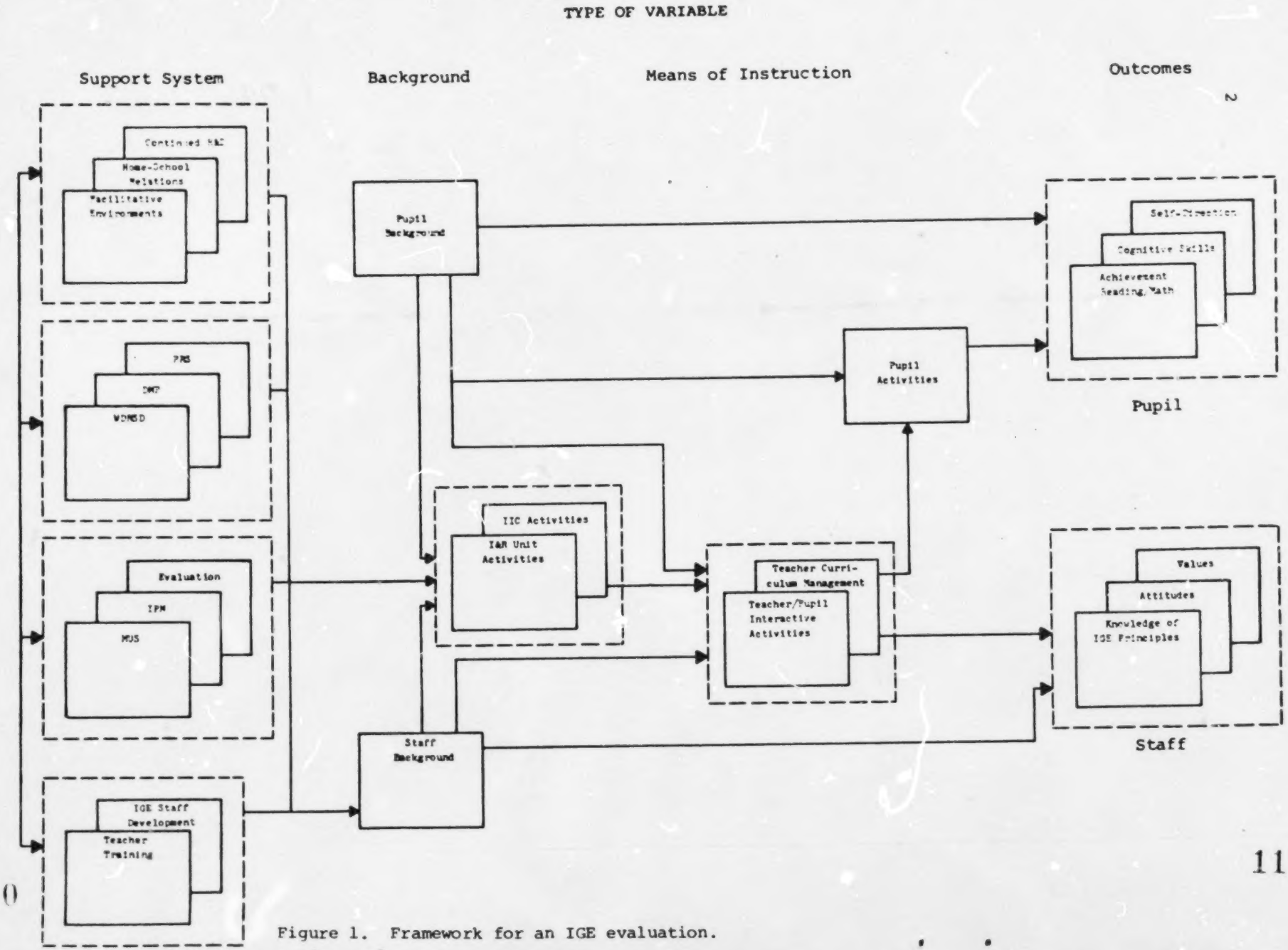


Figure 1. Framework for an IGE evaluation.

3. To gather basic information about how the Wisconsin Design for Reading Skill Development, the PreReading Skills, and the Developing Mathematical Processes programs are being used now and about how well chey meet their design objectives.

Specific purposes of Phase I are (1) to determine the degree to which the seven components of IGE have been implemented in IGE schools; (2) to describe the degree of component implementation in terms that can be related to means of instruction in reading and mathematics and then to relate that component implementation to means of instruction; (3) to describe the degree of component implementation in terms that can be related to staff outcomes and to pupil outcomes such as reading and mathematics achievement, selected cognitive skills and aspects of personality development, and then to ascertain the relationship of component implementation to those staff and pupil outcomes.

II

PLAN OF THE PHASE I STUDY

Phase I will relate features of IGE schools, which have varying degrees of implementation among IGE schools, to means of instruction and outcomes. Some of these features are surface characteristics which, though easily defined and studied, are indirect, facilitating conditions. Other features, though harder to study remotely, are the personalized instruction and processes of IGE schooling that motivated the development of the IGE organization. These underlying features are referred to hereafter as deep features.

SURFACE FEATURES

The surface features of an IGE school include:

1. The existence of a facilitative environment, comprised of a district in which there are other IGE schools, Systemwide Program Committee (SPC) meetings in which the school participates, a Regional IGE Coordinating Council (league, pact, hub, etc.) to which the school belongs, and a state IGE network.
2. The way in which children are organized in the school, which includes a multiunit school organization, Instruction and Research units (I & R units) that are multi-aged, the inclusion of all children in the unit arrangement, and units of recommended size.

3. Staff organization, which includes stable unit leadership in all units, regular unit planning meeetings, provision for staff release time, and regular meetings of the Instructional Improvement Committee (IIC), which is comprised of the unit leaders in the school and the principal.

4. Surface aspects of the Instructional Programming Model (IPM), which include:

   Step 1. a building-wide statement of educational objectives;

   Step 2. an estimation of the range attainable by subgroups in the school with respect to the building-wide educational objectives;

   Step 3. assessment of level of achievement, learning style, and motivation level through use of criterion-referenced tests, observation schedules, or work samples;

   Step 4. setting of instructional objectives for each child--typically for a short period of time;

   Step 5. placement of each student in an instructional program, which may be planned or implemented by teachers or which may be a previously available (commercial) program. Recommended variations in the instruction which individual students experience (Klausmeier, 1977a) are not included here because they are hardly "surface features" of the Instructional Programming Model;

   Step 6. assessment of each child for attainment of the instructional objectives that were set up in Step 4;

Step 7. make a decision about the individual child in light of the assessments made in step 6--a decision that eventuates in a return to step 4.

5. The use of IPM-compatible curriculum materials.
6. The simple maturity or longevity of the IGE program in the school--as a rough gauge of IGE implementation.

Surface features of IGE schools, such as those described above, are relatively easy to study. Perhaps for that reason, they have been used in many previous studies and evaluations of IGE. While IGE schools no doubt vary in their implementation of these surface features, it has not yet been demonstrated convincingly that these surface features are closely related to the sorts of teacher-pupil interaction and pupil experiences they are designed to promote. The harder-to-study, underlying characteristics of the instructional process of teacher-pupil interaction and pupil experiences are deep features.

DEEP FEATURES

Deep features of the Instructional Programming Model include:

1. The actual fit of instruction to the individual with respect to appropriate objectives and appropriate activities.
2. Programmatic continuity in the instruction received by an individual. This requires that the curriculum unit reflect schoolwide objectives, and that the curriculum unit be related to the preceding and subsequent curriculum units of the learner, who should be participating in a continuous learning cycle.
3. The sufficiency of time devoted to particular instructional objectives (using allocated time as an indicator).

4. The creativeness or inventiveness of instruction.

It is planned that, in Phase I, both surface features and deep features will be related to pupil and staff outcomes. Instruments used in the collection of data for Phase I will be previously developed instruments, which were described in an earlier document (Stewart, 1977). Those instruments, being remote means of data collection, are better adapted for the study of surface features. Phase I will, nevertheless, include deep features--insofar as that is possible with questionnaires, standardized tests, and other remote means of data collection.

In addition to the features described above, which are distinctive to IGE schools, pupil and staff background are assumed to be important determinants of both the instructional process and outcomes. Knowledge of prior pupil achievement, learning styles, and level of motivation is assumed to be necessary for effective grouping of students and selection of appropriate instructional activities. Staff experience with pupils, with groups, and, particularly, with IGE principles, are also assumed to be critical. In addition to their relation to the instructional process, aspects of pupil background may be regarded as concomitant variables related to pupil outcomes. Pupil outcome measures, especially standardized tests of scholastic achievement, should be considered in light of pupil background. For these reasons, pupil background and staff background will be included in Phase I.

Phase I will assess the relationship of the aforementioned surface and deep features with both pupil outcomes and staff outcomes. The assessment of relationships will be based on structural equation methods. Pupil outcomes to be included in Phase I are reading achievement, math

achievement, cognitive skills such as conceptualizing and problem solving, self-concept, and self-direction. Staff outcomes to be included in Phase I include teachers' attitudes about children and schooling, job satisfaction, and their knowledge of IGE principles concerned with individual differences among students and the use of the Instructional Programming Model.

III

THE POPULATION AND THE REQUIREMENTS OF THE ANALYSIS

THE POPULATION

The population with which this evaluation is concerned is constrained in several ways. The population is necessarily limited to those schools that define themselves as IGE schools. There were between 2000 and 3000 such schools in 1973-74 (Klausmeier, 1977b). The population studied by this evaluation is further constrained to include only those schools that responded fully to the IGE schools questionnaire of March 1976. There were 946 such schools, 768 of which have both second and fifth grade students. The evaluation will be limited to students at the IGE equivalent of second and fifth grades, and their teachers. Second grade is the first primary grade in which group-administered paper and pencil tests are sufficiently reliable. Fifth grade is the last elementary school grade common to all elementary schools. This population of 768 IGE schools is nationwide; it includes urban areas, rural areas, low-income areas, and high-income areas.

RANGE OF VARIABILITY

It is critical to the analysis of Phase I that the sample chosen reflect the full range of variability on the characteristics of schools being examined. There are two reasons for this; one is statistical, the other social. Statistically, an accurate assessment of relationships

among variables requires that the sample not be of restricted range with respect to its parent population. Restriction of range on any variable produces a sample estimate of relation that is weaker than the corresponding parameter in the population. Socially, it is important that certain subpopulations be adequately represented--both as parts of the general population and as separately identifiable populations of special interest. For example, schools in low-income neighborhoods, particularly urban neighborhoods, may be more important and deserve greater attention than their proportion of IGE schools would suggest.

DEGREES OF FREEDOM

The structural equations analysis planned for Phase I is a complex one. Relationships between many variables will be explicitly and implicitly assessed. An analysis like this requires many degrees of freedom, hence many schools. In light of the planned analysis, the Phase I IGE evaluation staff decided to seek a sample of 300 schools.

IV

SAMPLING PLAN

To select the sample of 300 schools, a plan of stratified random sampling was chosen, in preference to simple random sampling. In heterogeneous populations, where the strata reflect relevant dimensions of heterogeneity, stratified random sampling better ensures that small samples will represent the full variability of the population. The use of stratified random sampling, however, presupposes that all members of the population (in this case 768 schools) have been classified into mutually exclusive strata. These strata, as implied above, should each have memberships that are relatively homogeneous with respect to the characteristics whose representativeness is being ensured.

STRATIFICATION VARIABLES

Information about each of the 768 schools in the population was obtained through the March 1976 IGE Schools Questionnaire, which is shown in Appendix A. That questionnaire concerns the implementation of various IGE features thought to be influential with respect to pupil outcomes, teacher outcomes, and aspects of the instructional process. That information was used to construct seven variables, which are described below. These seven variables were then used to classify the population into strata.

RATING OF STAFF ORGANIZATION

The first stratification variable is a rating of the staff organization in each of the 768 schools. Using responses to the March 1976 questionnaire, this variable was operationalized in the following manner. Four questionnaire variables concerned with how the multiunit school organization is utilized were summed to provide a composite measure of staff organization in the multiunit school. The first constituent variable, which could take the ordered values of 0, 1, or 2, measured the regularity with which the Instruction & Research (I & R) unit staff held planning meetings. Questionnaire item III, 1B, "Does this unit staff have regular planning meetings at least once a week?" was the basis for this first variable. If the answer for an I & R unit was yes, a score of 2 was assigned to the unit. If the answer was no, a score of 0 was assigned. I & R units consisting of one teacher were given a score of 1. The mean score for the I & R units in a school was used as the school score.

The second variable, based on item III, 3B, "How many hours per week of release time does each unit typically have?" was a dichotomous rating of the sufficiency of release time for unit staff in the school. If the answer for the school was two hours or more per week, the school was given a score of 2. If the answer was less than that, the school was given a score of 0.

The third variable was concerned with the school's policy about unit leaders. It is based on questionnaire item III, 4A, "Do all of your regular acacemic units have unit leaders?" and item III, 4B, "Is it your school's policy to rotate the unit leader role among unit teachers?"

Schools where all units have leaders and where leaders are not rotated were given a score of 1. Schools where some units or all units do not have leaders were given a score of 0. The ordering of schools on this variable is based on the assumption that good leaders should not be "rotated out."

The fourth variable is a rating of the frequency with which the principal and unit leaders meet. Meetings among the principal and unit leaders are desirable according to the IGE literature, and should occur at least weekly. Questionnaire items III, 5A and B were concerned with the existence and frequency of such meetings. A score of 2 was given to schools with meetings that occur weekly or more often. A score of 1 was given to schools whose meetings occur semi-weekly. A score of 0 was given to schools whose meetings occur less frequently than semi-weekly, or not at all.

The four variables described above--regular unit staff planning meetings, release time for staff, ongoing unit leadership, and meetings of principal and unit leaders--were summed to form a composite measure reflecting the staff organization in the multiunit school. The maximum score on each of the four constituent variables was 2; the minimum, 0. The composite measure thus ranges from a minimum of 0 to a maximum of 8. The distribution of this stratification variable in the population is given in Figure 2-1.

AGE OF THE PROGRAM

The second stratification variable is the age of the program; that is, the number of years the school has been an IGE school. The year when

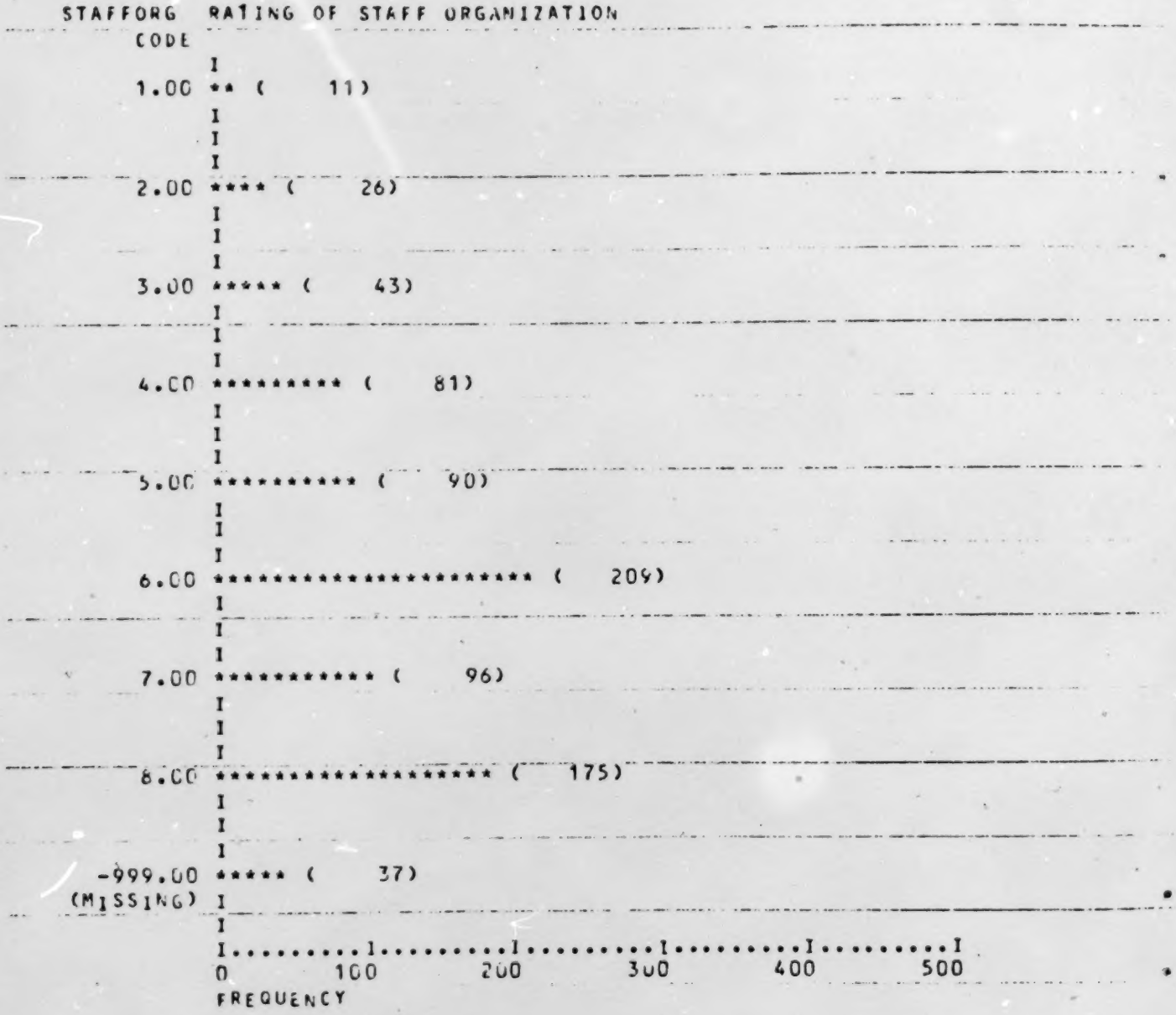


Figure 2-1. Rating of staff organization (population histogram).

IGE was begun in each school was obtained from questionnaire item I, 2. Insofar as the implementation of various IGE components requires time and local adaptation, one would normally assume that a school in its fourth year as an IGE school has more things implemented than it did in its preceding years. The age of the program may thus be used as a rough "proxy variable" for over-all degree of IGE implementation. Age of the program is at best rough, however, since some schools in their second year will have accomplished more than other schools in their fifth year. The distribution of this variable is given in Figure 2-2.

UTILIZATION OF THE INSTRUCTIONAL PROGRAMMING MODEL

The third stratification variable is a rating of how extensively the Instructional Programming Model (IPM) is being used in a school. The information on which this rating is based was obtained from Questionnaire item III, 1B. This variable is a composite based on whether or not the IPM has been "fully disseminated" in each of six curriculum areas. Those areas are reading, math, science, social studies, music or art or physical education, and language arts. The IPM in any one of these curriculum areas is considered to be "fully disseminated" if all units in the school report using the IPM in that area. Corresponding to each of the six areas, then, is a dichotomous, 0-1 score which shows whether the IPM has been implemented in that curriculum area by all units. The composite IPM scale is a weighted sum of these six 0-1 scores. Reading and math, insofar as these subject areas have received greater attention from Wisconsin R & D Center curriculum developers, were weighted more heavily. The weighted sum referred to as the IPM Scale is shown by the formula below:

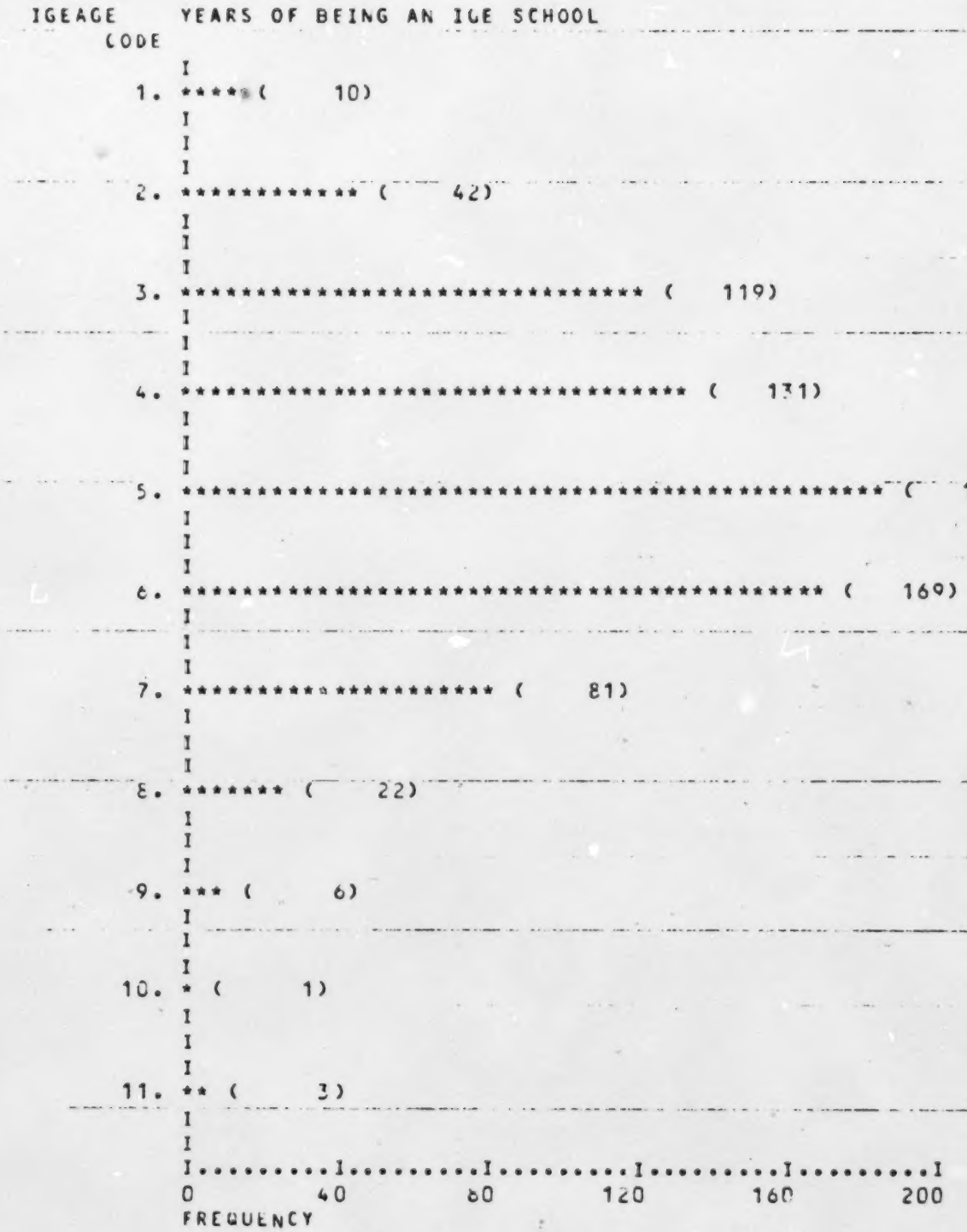


Figure 2-2. Age of the program (population histogram).

IPM Scale = (10 x Reading IPM) + (10 x Math IPM) +
(2 x Science IPM) + (2 x Social Studies IPM) +
(2 x Music or Art or Physical Education IPM) +
(2 x Language Arts IPM).

The distribution of this variable is presented in Figure 2-3.

RATING FOR FACILITATIVE ENVIRONMENT

The fourth stratification variable is a rating of the school for its facilitative environment. Facilitative environments represent the sixth component of IGE (Klausmeier, Quilling, Sorenson, Way & Glasrude, 1971, chap. 2). This rating of facilitative environment is based on three pieces of information. First, whether the school is part of a communication network larger than the district to which the school belongs (questionnaire item II, 2a-2B). Second, whether there are other IGE schools in the district (questionnaire item II, 1A). Third, whether the school reports communication with other IGE schools in the same district (questionnaire item II, 1B-1C). Schools were classified dichotomously according to each of these three questions. Of the $2^3 = 8$ conceivable combinations of answers to these three questions, two combinations are impossible.

A school that belongs to a communication network larger than its district but which has no other IGE schools in its own district could not possibly communicate with other IGE schools in its own district. That would also be true for a school which does not belong to a communication network larger than its own district and which is the only IGE school in its own district. The six possible combinations of answers are ordered and rated as follows:

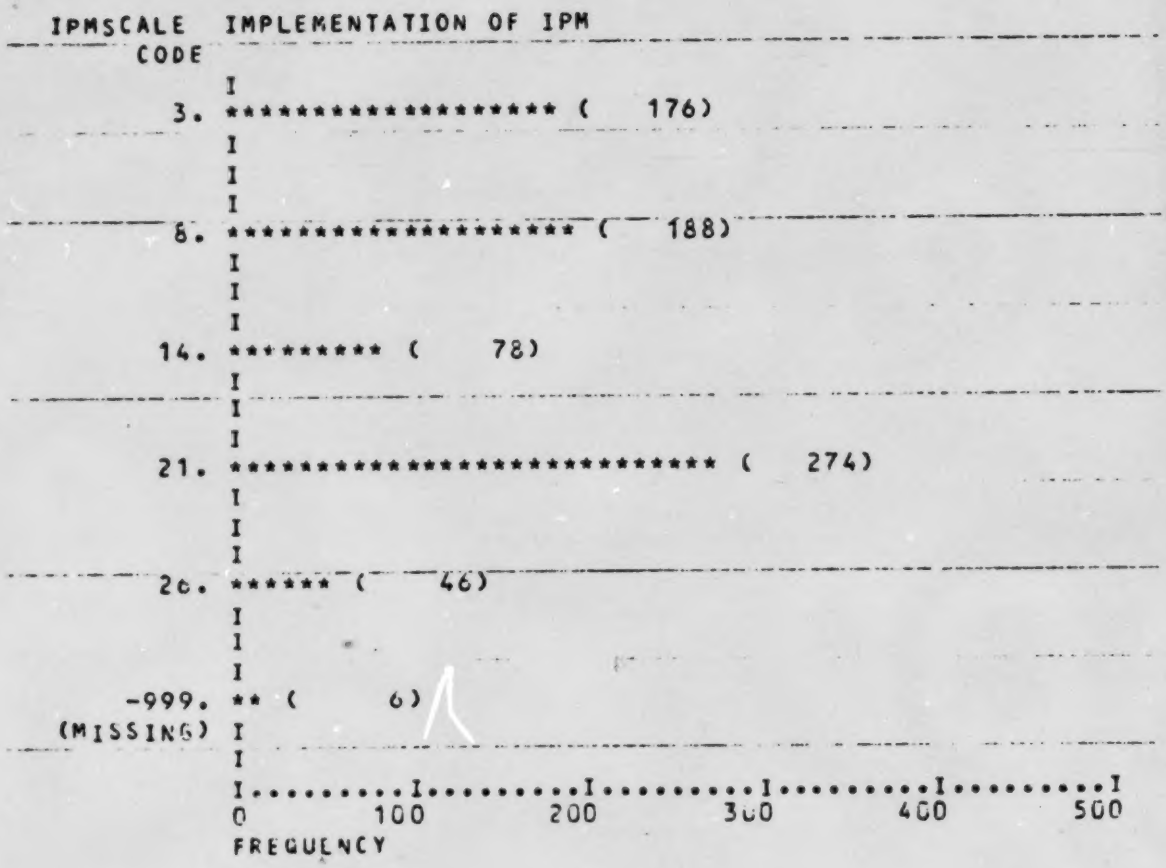


Figure 2-3. Utilization of the Instructional Programming Model [population histogram (N=768)].

rating	inter-district communication network	other IGE schools in district	intra-district communication among IGE schools
6	1	1	1
5	1	0	0
4	1	1	0
3	0	1	1
2	0	1	0
1	0	0	0

The distribution of this variable is presented in Figure 2-4.

RATING OF THE ORGANIZATION OF CHILDREN IN THE SCHOOL

The fifth stratification variable is ordered with respect to how children are organized in the multiunit school. This variable is itself a composite of three other variables concerned with how children are organized in a multiunit school. The three constituent variables, which are described below, were transformed to standard scores, respectively. The composite measure of the organization of children in the multiunit school is a sum of these three standard scores.

The first constituent variable reflects the desirability of I & R unit size. This variable is based on the assumption that an I & R unit can have too few children or too many. There is, in other words, an optimal range for a unit's size. Unit size was broken into three ranges, which were ordered in terms of their desirability. The ordering of unit size in terms of desirability has been based on judgments of persons on the IGE Implementation Project staff--specifically, Walt Krupa. The most desirable unit size is from 100 to 125 children. Units with 75 to 99

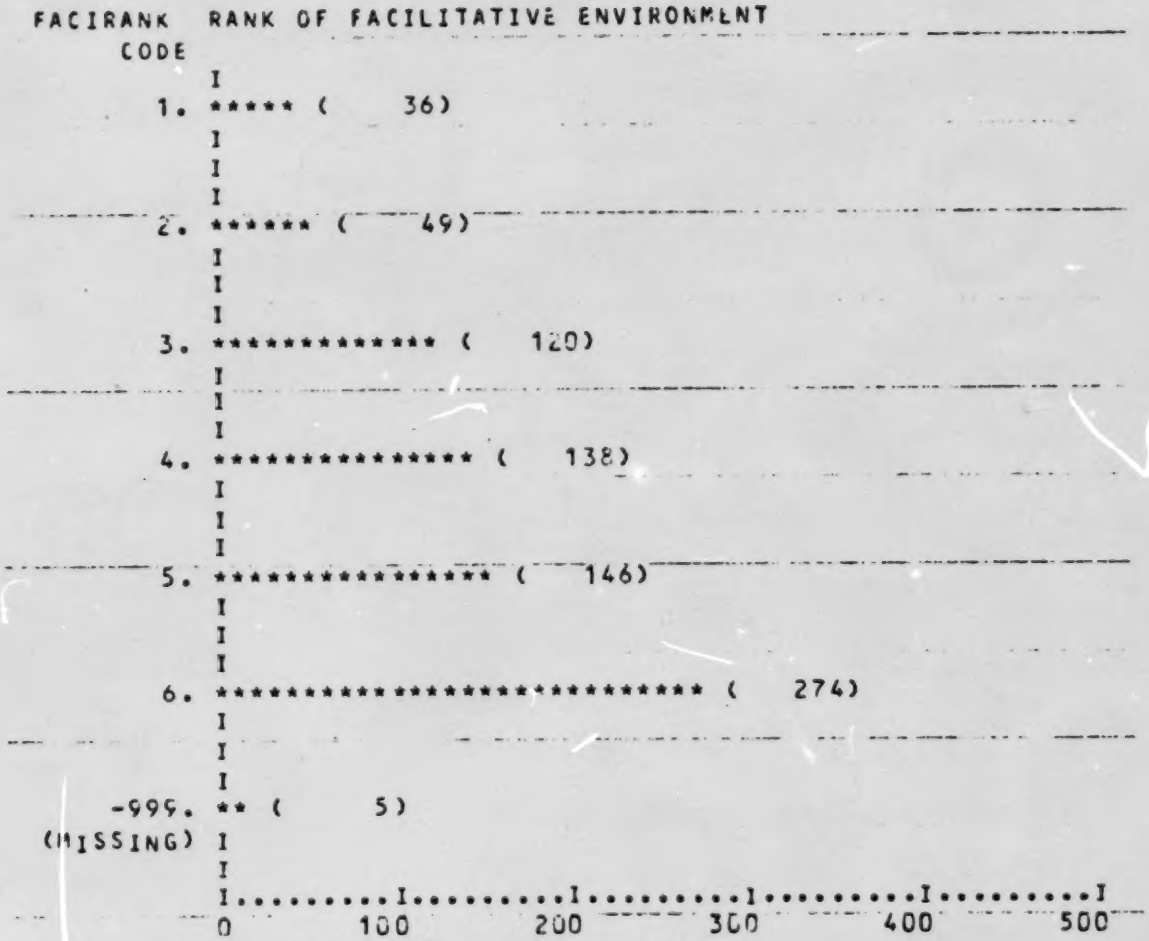


Figure 2-4. Rating for facilitative environment [population histogram (N=768)].

students are workable, but small. Units with 126 to 150 students are workable, but large. Units with fewer than 75 students presumably lack the "critical mass" needed for a unit to function well. Units with more than 150 students presumably have too many students to be effectively managed. The rating in terms of desirability is shown below:

3 = unit size of 100 to 125

2 = unit size of 75 to 99 or 126 to 150

1 = unit size less than 75 or greater than 150

The rating of 2 was given to units somewhat smaller than the ideal and to units somewhat larger than the ideal; though dissimilar in size, these units are similar insofar as they are not ideal, but workable. The rating of 1 was given to units too small or too large; though dissimilar in size, these units are alike insofar as their size is outside the recommended range.

Classification according to the desirability of a unit's size is, necessarily, applicable to units and not to schools. Insofar as the sampling procedures are based on the choice of schools, and not of units, it was necessary that each school be described in terms of its aggregated units. The scale for desirability of I & R unit size was applied to each unit within a school. The mean score for the units in a school was then used as that school's score.

The second constituent variable is a rating of the extent to which all children in a school have been included in the I & R unit arrangement; this variable is based on responses given in questionnaire items III, 1C-2. The rating scheme is shown below:

3 = schools where all children are included in the unit arrangement

2 = schools where all children beyond kindergarten age are included in the unit arrangement, but kindergarten children are grouped separately

1 = schools where some children beyond kindergarten age are grouped in self-contained classes apart from the IGE program.

The third constituent variable is a rating of the extent to which multi-aged grouping has been implemented in the school. The variable is based on information about multi-aged grouping from questionnaire item III, 1B. The rating scheme is

3 = schools where all of the units have multi-aged grouping

2 = schools where some but not all of the units have multi-aged grouping

1 = schools where none of the units has multi-aged grouping

The three constituent variables presented above were then summed to form a composite measure of how children are organized in the multiunit school. The distribution of this variable is presented in Figure 2-5.

USE OF R & D CENTER CURRICULUM PRODUCTS

The sixth stratification variable is an indicator of the extent to which a school is using R & D Center curriculum products. One of the major components of IGE is the utilization of IPM-compatible materials. While Center-produced materials are not the only IPM-compatible materials, they are the only such materials specifically covered in the March 1976 IGE Schools Questionnaire. Questionnaire item V, 1A was specifically devoted to the use of R & D Center Curriculum products. Schools responding to the questionnaire were also invited to name other products or

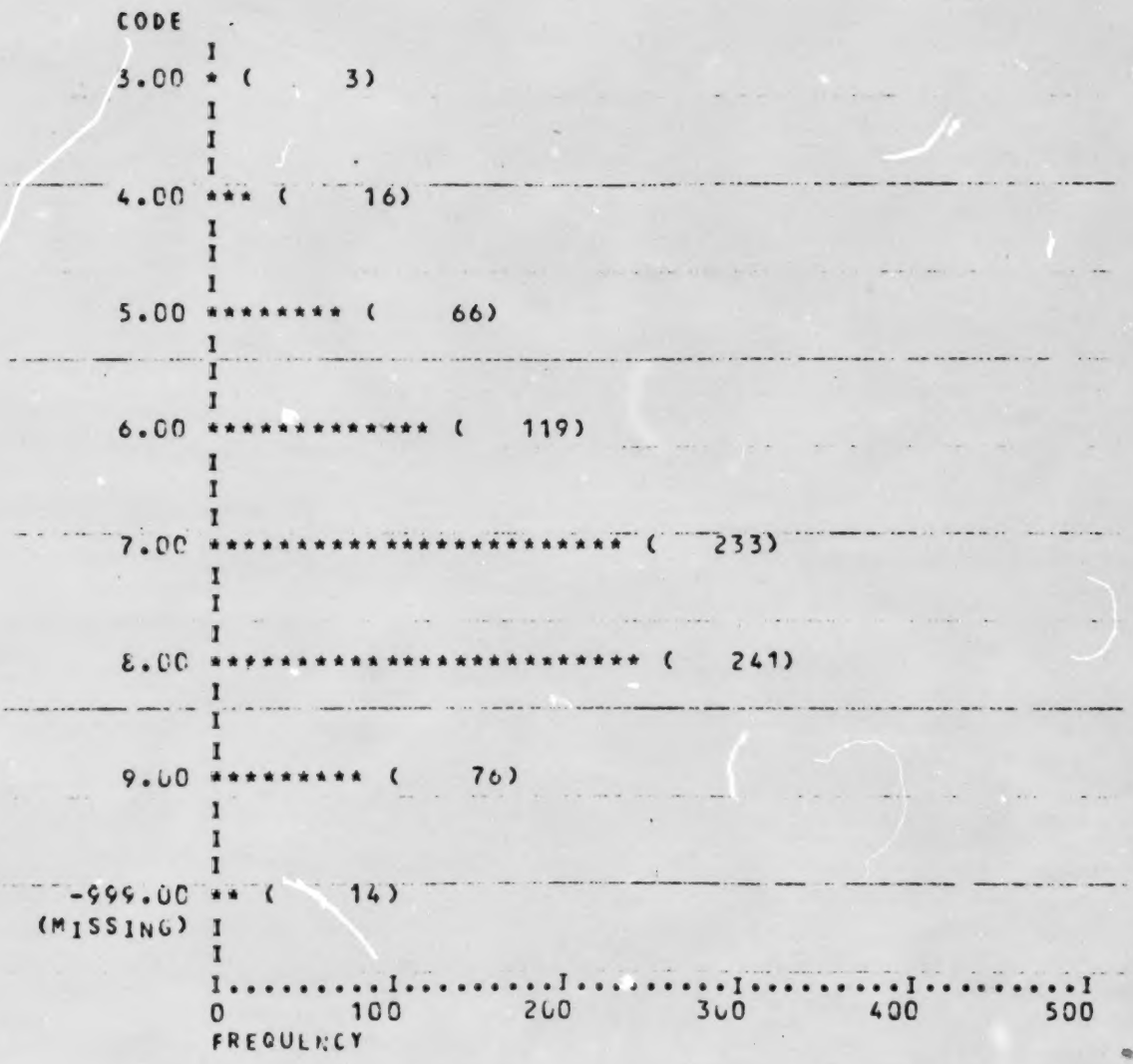


Figure 2-5. Rating of the organization of children in the school [population histogram (N=768)].

programs adapted to individualizing instruction. The variety in the volunteered responses was so great that it made this information useless for the purpose of sampling.

Four Wisconsin R & D Center products are the basis of this scale. Those products are the Wisconsin Design for Reading Skills Development (WDRSD), Developing Mathematical Processes (DMP), PreReading Skills (PRS), and Individually Guided Motivation (IGM). A school was rated with respect to each curriculum product; non-implementation of a product was given a score of 0, implementation a score of 1. A composite curriculum product scale was formed as a weighted sum of these four 0-1 scores. WDRSD and DMP received a heavier weighting. The curriculum products scale was defined as follows:

$$\text{Curriculum Product Scale} = (10 \times \text{DMP}) + (10 \times \text{WDRSD}) + (3 \times \text{PRS}) + (3 \times \text{IGM})$$

Schools that have used neither WDRSD nor DMP have scores below 10. Schools that have used both of these products have scores of at least 20. While the variable above was used in that form as a stratification variable, its scale has been simplified as follows for clarity of discussion:

3 = schools using both WDRSD and DMP

2 = schools using one but not both of WDRSD and DMP

1 = schools using IMP-compatible curriculum products, but none from the Wisconsin R & D Center

0 = schools apparently using no IPM-compatible materials

The distribution of this variable is presented in Figure 2-6.

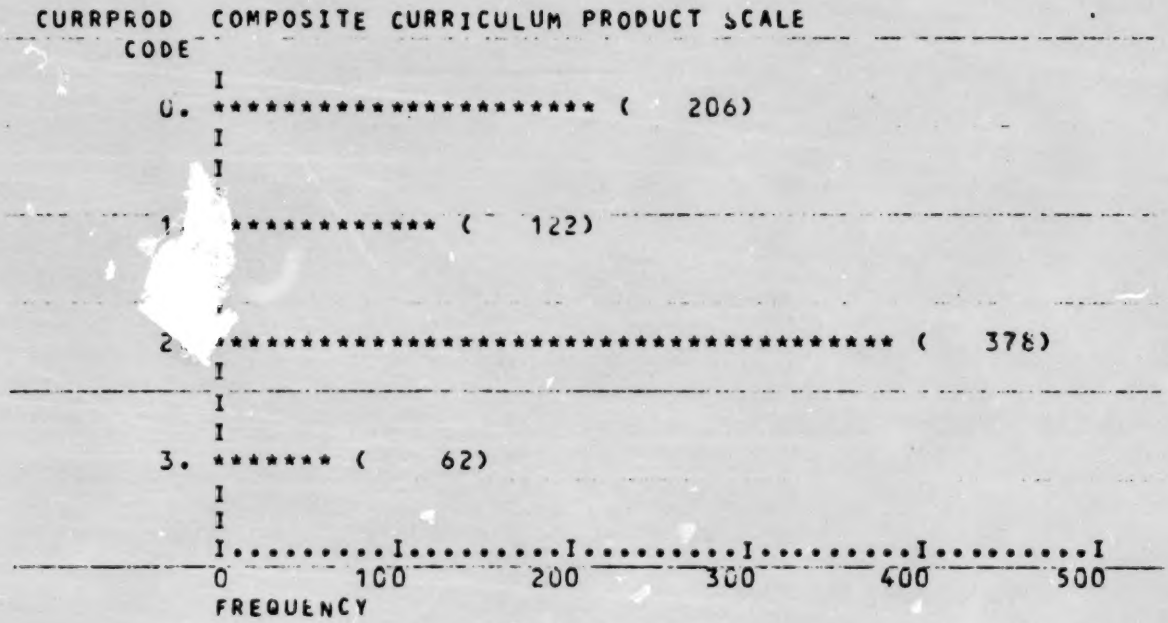


Figure 2-6. Use of IPM-compatible curriculum products [population histogram (N=768)].

DEMOGRAPHIC INFORMATION

Demographic information was used to form the seventh stratification variable. Schools were described by a single demographic scale, which combined information about (1) the number of persons residing in the school district, (2) the median income in the school district, (3) the percentage of persons in the school district below poverty level, (4) the median years of schooling of adults in the school district, (5) whether a majority of the students in the school are classified as Title I students, (6) the percentage of persons in the school district described as black. Census information and the informed judgment of Pam Klopp and Richard Holman, R & D Center employees who were primarily responsible for organizing the data, were the basis of scaling for schools with missing data on some variables. These six constituent variables were individually converted to standard scale. The composite demographic scale, in most cases, was the mean of these six standard scores. Schools with missing data on one of the constituent demographic variables were given the mean of the five variables for which there was non-missing information. Schools for which there was valid information on only four variables were given the mean of those four corresponding standard scores, etc. This procedure for handling missing data ignores the specific information carried by each indicator. While imperfect--as any single indicator of demographic information must necessarily be--this composite provided a parsimonious way to represent demographic differences among schools. The distribution of this variable is presented in Figure 2-7.

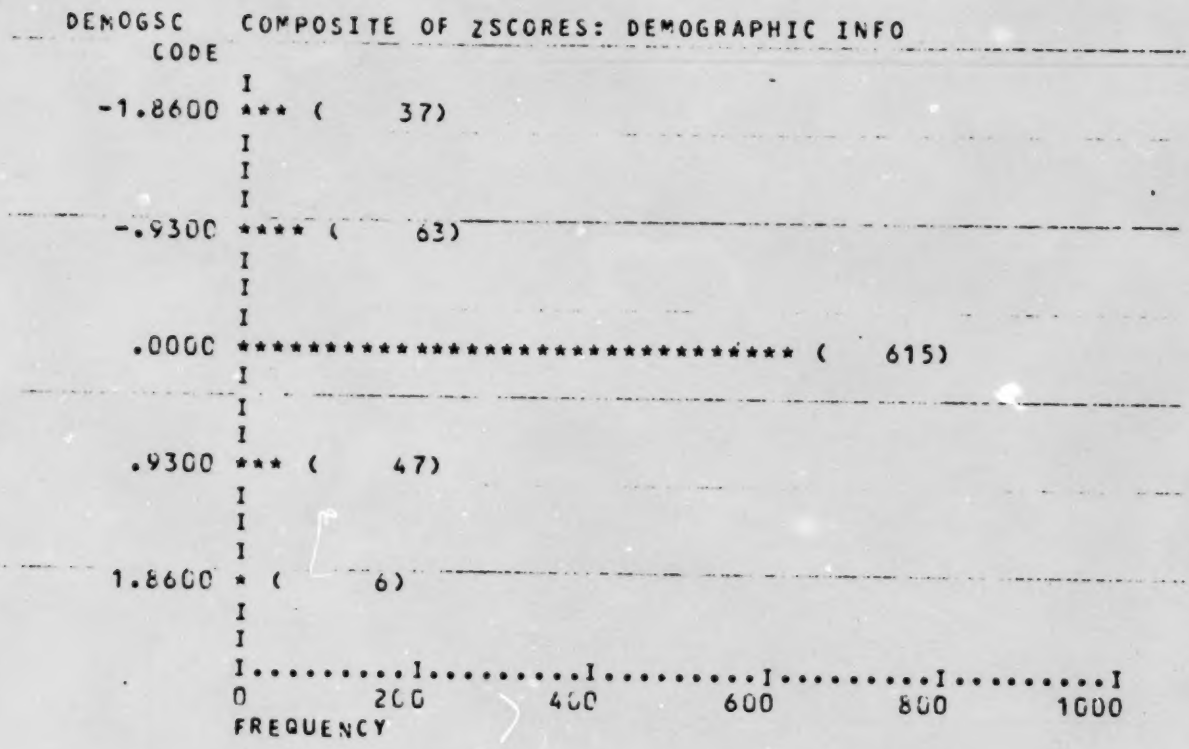


Figure 2-7. Composite of demographic information [population histogram (N=768)].

V

DISTRIBUTIONS AND RELATIONS AMONG STRATIFICATION VARIABLES

The histograms in Figures 2-1 through 2-7 present compressed information for visual simplicity; Appendix B provides the actual frequency distributions of each stratification variable. Table 1, which appears below, is a matrix of correlations in the population between the seven stratification variables.

TABLE I

CORRELATIONS AMONG STRATIFICATION VARIABLES
(N=768)

	FACIRANK	CURRPROD	IPMSCALE	SCHOOLOR	STAFFORG	IGEAGE	DEMOGSC
FACIRANK	1.0000	.0688	.0857	.0891	.1064	.1016	.0303
CURRPROD	.0688	1.0000	.0706	.0264	.0488	.1057	.0291
IPMSCALE	.0857	.0706	1.0000	.1296	.1513	.0750	.0095
SCHOOLOR	.0891	.0264	.1296	1.0000	.1237	.0227	-.0189
STAFFORG	.1064	.0488	.1513	.1237	1.0000	.1451	.0180
IGEAGE	.1016	.1057	.0750	.0227	.1451	1.0000	.1585
DEMOGSC	.0303	.0291	.0095	-.0189	.0180	.1585	1.0000

FACIRANK - Rating of Facilitative Environment
CURRPROD - Use of R & D Center Curriculum Products
IPMSCALE - Utilization of the Instructional Programming Model
SCHOOLOR - Rating of the Organization of Children in the School
STAFFORG - Rating of Staff Organization
IGEAGE - Years School Has Been an IGE School
DEMOGSC - Composite of Demographic Information

VI

IDENTIFYING STRATA WITH MULTIPLE DIMENSIONS

The process of sampling always entails a sampling frame. In simple random sampling, the sampling frame treats all cases in the population in an undifferentiated way. Each case selected comes from that same undifferentiated pool. With stratified random sampling, the population is divided into exclusive sets of cases, known as strata. Members of a particular stratum are supposed to be equivalent with respect to the information used to create the strata; the equivalence can be relative to the members of other sets.

Strata can be created or identified in several ways. In demographic research, discrete, qualitative variables (such as race, religion, party membership, or city of residence) are often used to create exclusive, unordered classes. The nominal values of any one of these variables correspond to classes, each of which can be treated as a stratum. For example, city of residence is a variable whose values correspond to classes (Atlanta residents, Chicago residents, Seattle residents, etc.) which can be used as strata. Intersections of classes defined by multiple variables can also be treated as strata. For example, a demographic researcher might consider all Baptist Socialists who live in Dubuque, Iowa as a stratum defined in terms of religion, party membership, and city of residence.

Ordinal variables can also be used to identify strata. Cases that differ with respect to a single ordinal variable can be divided into exclusive strata, which are defined in terms of cutting scores. A stratum may be supposed to be more similar to a stratum adjacent to it in ordinal scale position than to strata not adjacent to it.

Multiple ordinal variables can be used to identify strata whose members are similar in multi-dimensional space. Though not commonly used for sampling purposes, cluster analysis is concerned with identifying "clusters" of cases that are most alike on multiple dimensions. Cluster analysis usually proceeds with the creation of a matrix that describes the similarity (multi-dimensional proximity) of every pair of cases. Strictly speaking, such assessments of proximity should be based on variables that have an interval scale. Few variables of interest to social scientists meet that requirement convincingly.

Where a large number of cases is involved, cluster analysis is poorly suited, since the similarity of each pair of cases must be calculated. Cluster analysis of 700 cases would require the calculation of 244,650 pairwise similarity measures. The segmentation of a sizable population into clusters would thus be very costly.

An alternative to cluster analysis is tabular analysis, which treats each variable as a dimension. The crossing of different dimensions, each of which has been segmented, creates cells containing cases who have received similar values on the variables involved. Since cells have been defined in terms of scale divisions--and not the actual distribution--it is possible for some cells to contain no cases and other cells to contain

many cases. The sensitivity of a tabular analysis to practical differences among cases is dependent upon the scale divisions used for each variable. Furthermore, if there is redundancy among variables used in tabular analysis, there are more cells than needed. When variables are wholly or partly redundant, some cells will necessarily have many cases while other cells necessarily have few cases. The use of nonredundant (orthogonal) dimensions provides the most parsimonious means of classifying cases into cells on the basis of similarities among cases with respect to multiple, correlated variables.

ORTHOGONALIZED STRATIFICATION VARIABLES

When cases are described by stratification-relevant variables containing redundant information, the set of stratification variables can be reduced in rank by using the principal components of that set (Harman, 1967). Where there are practical limitations on the number of strata usable in a sampling frame, not all principal components need be used. Since earlier principal components are the major dimensions of variation among cases with respect to the stratification variables, they would usually be retained. Principal components may or may not have useful substantive interpretations. Even in the absence of plausible substantive interpretations, principal components afford the evaluator or researcher an operationally clear and parsimonious means of representing similarities and differences among cases in terms of multiple, redundant variables.

Principal components, when used as the basis for a tabular analysis, provide two advantages. The first, which has been suggested above, is

that the dimensions in the table are nonredundant; thus, there are no cells that must necessarily have few or no cases in them. The second advantage stems from the fact that earlier principal components account for a larger amount of the variation among cases than do later principal components. Such major dimensions can thus be divided more finely than others--paying greater heed to where the greatest differences among cases exist.

CELL DEMARCATIONS

Cell demarcations in a measurement space of multiple, orthogonal dimensions may be determined in various ways. In tabular analysis certain scale values typically are used as cutting scores. While such cutting scores can usually have a substantive basis when one is using untransformed variables, a substantively justified cutting score for a principal component is less likely. For the purposes of defining cells as strata in the sampling frame of this evaluation, therefore, cutting scores on principal components were defined in terms of population percentiles.

For reasons presented above, the seven variables used to stratify schools in the population were orthogonalized into principal components. The principal components were used to create distinct strata, each containing approximately 11 schools. Schools within a given stratum were similar with respect to their values on the seven stratifying variables. The seven principal components and how the seven stratification variables load on them are presented in Tables C-1 through C-7 in Appendix C. Principal component V and principal component VII have been moved to

Tables C-6 and C-7 near the end of that Appendix, since they were not used as stratification dimensions.

THE SAMPLING FRAME

The sampling frame consisted of 64 cells, treated as strata. The number of strata (cells) in a sampling frame is practically limited by the number of cases in the population. In the extreme, there would be one case per stratum--defeating the purpose of grouping like cases. The plan in Phase I was to draw a sample of approximately 300 schools--which is about 40 percent of the population. Forty percent of the cases in each stratum were thus to be randomly selected from within each respective stratum. For a stratum to be adequately represented by a sample drawn randomly from it, the sample should contain at least several cases. It was decided that 64 strata (cells) was the largest useful number, resulting in approximately 11 schools per stratum. This permitted the segmentation into population quartiles along the first principal component and median splits (50th percentile) on four other principal components.

UNUSED PRINCIPAL COMPONENTS

Five of the seven principal components were used to define the sampling frame. It was thus necessary to eliminate two of the principal components. Principal component VII was not used because it explained less variation among cases in terms of the stratification variables than any other principal component, and the mix of information in it afforded no ready substantive interpretation. Principal component VI was chosen in preference to principal component V, because the scale reflecting the utilization of the Instructional Programming Model--a feature of

particular interest in the evaluation--was heavily loaded on it. There was little difference between principal component V and principal component VI, in terms of the variance they accounted for.

VII

SELECTION OF THE SAMPLE

The reason for creating a sampling frame was to ensure and assess that the sample would reflect fully the range of variability on the characteristics measured by the seven stratification variables. Given a sampling frame, selection from it can be systematic, or it can be random (stratified random sampling). To ensure that schools were chosen from the sampling frame without bias, the selection was random.

RANDOM SAMPLING

A computer program based on a random number generator was used to select 39 percent of the cases from each stratum. Because 39 percent of the cases in a stratum was seldom a whole number, the sampling program rounded such nonintegers to the nearest integer, thus determining the number of schools to be drawn from a given stratum. There were 302 schools initially designated in this manner as part of the IGE evaluation sample.

INITIALLY DRAWN SAMPLE

The initially drawn sample of 302 schools resembled very closely the population of the 761 schools from which it was drawn. The univariate distributions of this sample on the seven stratification variables are presented in Figures D-1 through D-7 of Appendix D. These distributions may be compared with the univariate distributions of the population, which

were presented in Figures 2-1 through 2-7. The sample on which the evaluation is ultimately being based, however, is not this initially drawn sample. Far fewer schools than the IGE evaluation team had anticipated agreed to participate in the evaluation.

PREVIOUSLY UNSELECTED SCHOOLS INVITED

So few of the schools which were chosen initially agreed to participate in Phase I of the IGE evaluation, it became apparent to the evaluation team that all schools in the population should be invited to participate, in order to obtain enough participating schools. In the end, the evaluation is being based on that subset of schools willing to participate in the evaluation--a sample based on self-selection. At the time of this writing there are 175 schools participating in Phase I.

The schools gave many reasons for not participating in the evaluation. Some common reasons were that (1) as an IGE school, they had participated or were presently participating in too many studies; (2) between the years 1976-77 and 1977-78, there was a change in administrative personnel planned, and the present administrator did not want to create an obligation for the future administration; (3) the school no longer regarded itself as an IGE school. Some schools gave no reason. A later report will describe and tabulate the reasons given for nonparticipation.

There is a danger that self-selection has created a sample that differs significantly from the population in terms of the IGE characteristics with which the evaluation is concerned. In the absence of a carefully developed sampling frame, we would be unable to determine

whether the 175 participating schools differ from the population (or from the initially selected sample). The sampling frame, however, provided a means of assessing whether and how the participant schools differ from the population.

GAUGE OF REPRESENTATIVENESS

The stratification variables and the strata of the sampling frame can be used to gauge how well the participant schools represent the total population. The nature and extent of difference between the self-selected sample and the population can be assessed by examining their distributions on the stratification variables, or in terms of their cell frequencies in the sampling frame.

The histograms in Appendix D provide a visual sense of how this sample compares with the population. The histograms are based on 173 schools; subsequent additions or deletions of a few schools from the sample should have negligible effect on the distributions. Each page of Appendix D provides a convenient, though approximate, comparison; that comparison is actually between the initially drawn sample (N=302) and the 173 participating schools. Exact comparisons with the population are possible by looking at Figures 2-1 through 2-7, too. Remarkably, the self-selected sample appears very similar to the population in terms of the stratification variables.

ACTUAL SAMPLE

The actual sample on which further analyses are to be based will be known when schools have returned the Phase I questionnaires and tests.

At that time a multivariate comparison between the participating schools and the nonparticipating schools will be made as a test of the hypothesis that there is no difference between the groups, in terms of information available prior to Phase I participation.

REFERENCES

Harman, H. Modern factor analysis. Chicago: University of Chicago Press, 1967.

Klausmeier, H. J. Instructional programming for the individual student. In H. J. Klausmeier, R. A. Rossmiller, & M. Saily (Eds.), Individually guided elementary education: Concepts and practices. New York: Academic Press, 1977. Pp. 55-76. (a)

Klausmeier, H. J. Origin and overview of IGE. In H. J. Klausmeier, R. A. Rossmiller, & M. Saily (Eds.), Individually guided elementary education: Concepts and practices. New York: Academic Press, 1977. Pp. 1-24. (b)

Klausmeier, H. J., Quilling, M. R., Sorenson, J. S., Way, R. S., & Glasrud, G. R. Individually guided education and the multiunit school: Guidelines for implementation. Madison: Wisconsin Research and Development Center for Cognitive Learning, 1971.

Romberg, T. A. IGE evaluation: Perspectives and a plan. Working Paper No. 183. Madison: Wisconsin Research and Development Center for Cognitive Learning, 1976.

Stewart, D. M. Instrumentation for phase I of the IGE evaluation. Unpublished Project Paper 77-1. Madison: Wisconsin Research and Development Center for Cognitive Learning, 1976.

APPENDIX A

IGE SCHOOLS QUESTIONNAIRE
MARCH 1976

OMB Approval
Form #51-S76008
Approval expires 11/76

IGE Schools Questionnaire **March, 19..**

I. Background

1. Do you consider your school an IGE school? (Check one)

____Yes ____We're working on it ____Never have been ____Not any more.
(If you check this last response please give your reasons for dropping the IGE program in the space below. Please answer questions 2 and 3 and then return this questionnaire in the accompanying envelope.)

2. When did your school organize its first I & R unit or learning community?

fall spring 19_____
(circle one) (year)

3. With which agency did your school's involvement in IGE originate?

____Wisconsin R & D Center for Cognitive Learning
____Institute for Development of Educational Activities, /I/D/E/A/ (Kettering Foundation)
OR ____both ____other ____I don't know

4. How many students are currently enrolled in your school (to nearest 25)?_____

5. Circle the grade level equivalents OR ages of pupils included in your school:

Grade:	K	1	2	3	4	5	6	7	8	9	10	11	12
Age:	5	6	7	8	9	10	11	12	13	14	15	16	17

II. Affiliation With Other IGE Schools

1. a. Is there more than one IGE school in your school district or school system (i.e., the area under the jurisdiction of your school board)?

____No ____Yes ____I don't know

b. If yes, do you have meetings about IGE with representatives from only these IGE schools and Central Office personnel? (This group might be called the System-wide Program Committee [SPC])

___No ___Yes

c. If yes, how often does this group meet?

____less than once a year
____once a year
____twice a year
____four times a year
____more than four times a year

2. a. Does your school belong to any other group of IGE schools (such as a League, Network, PACT, or HUB) which includes IGE schools that are <u>not</u> in your school district or school system?

___No ___Yes

b. If yes, what is the name of this group? _____

III. School Organization

For questions 1a-c we are concerned with regular*, academic** units*** and teachers only. (Another R & D Center questionnaire has already surveyed special area teachers and units.)

1a. How many regular, academic units are in your school?_____

b. On the chart below, describe each regular, academic unit according to the questions at the left. Exclude special area teachers, student teachers/interns, and aides: (If there are more than 7 regular, academic units please attach a page listing this information for those units)

Units:	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
Grade level equivalent(s)							
Number of fulltime teachers assigned only to this unit (including unit leader)							
Number of pupils (approximate)							
Does this unit include any special education pupils?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
Does this unit staff have regular planning meetings at least once a week?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
IGE subject(s) (An IGE subject is one in which teachers follow the whole sequence of: identifying objectives for the students in their unit, preassessing for those objectives, then grouping students according to which objectives they need to master, instructing on those objectives, then testing again, and regrouping.)	IGE subject(s):	IGE subject(s):	IGE subject(s):	IGE subject(s):	IGE subject(s):	IGE subject(s):	IGE subject(s):

*"regular" i.e., not composed exclusively of special education pupils.
**"academic" i.e., not composed exclusively of special area teachers (art, music, etc.)
***The term "unit" describes a "learning community" as well. Similarly, "unit leader" refers to "learning community leader" as well.

1c. Does the description on the chart account for all the pupils in the school?

_____ Yes _____ No, not included are (check all that apply):

_____ all or some kindergarten pupils
_____ all or some special education pupils
_____ other "regular" (not kindergarten and not special ed) pupils in self-contained classrooms
_____ other, please specify: _____

2. If you have special education pupils in your school do any of these pupils receive instruction on a regular basis in a regular, academic unit?

   ____No ____Yes ____No special education pupils

3. a. Has your school made any provision for release time during the school day for unit staff members to plan together? ___No ___Yes

   b. If yes, how many hours per week of release time does each unit typically have? _____hours per week

4. a. Do all of your regular academic units have unit leaders? ___No ___Yes

   b. Is it your school's policy to rotate the unit leader role among unit teachers? ___No ___Yes

   c. If yes, how often are the leaders rotated? ____less than once a year
   ____once a year ____twice a year ____more than twice a year

5. a. Do the principal and unit leaders meet as a group at regular intervals (in addition to school-wide faculty meetings)? ___No ___Yes

   b. If yes, how frequently does this group meet?

   ____twice a year ____twice a month (every 2 weeks)
   ____once a month ____once a week
   ____other, please describe: _____
   _____

6. a. Do you have an Instructional Materials Center (IMC)? ___No ___Yes

   b. If yes, do you have an IMC director? ___No ___Yes, fulltime___
   parttime___

7. a. Does your school have any paid instructional or clerical aides? ___No ___Yes

   b. Does your school have any volunteer instructional or clerical aides? ___No ___Yes

8. a. Does your school have any student teachers/interns this semester (Spring, 1976)? ___No ___Yes

   b. Did your school have any student teachers/interns last semester (Fall, 1975)? ___No ___Yes

IV. Assessment and Evaluation

1. a. Does your school participate in a standardized achievement testing program? ___No ___Yes

   b. If yes, check all the curricular areas in which standardized achievement tests are given:

   ____reading ____social studies ____science
   ____language arts ____math ____other

Return to: Wisconsin R & D Center
1025 West Johnson Street
50 Madison, Wisconsin 53706

2. a. Has your school or school district ever done an evaluation of the IGE program? ___ No ___ Yes

b. If yes, how can we get a copy of the evaluation report?

_____

_____

_____

V. Curriculum Products

1. a. Check any of the following R & D Center curriculum products being used in your school:

____Developing Mathematical Processes (DMP)
____PreReading Skills (PRS)
____Individually Guided Motivation (IGM)

Check IGM procedure(s):

____Adult-child conferences to encourage independent reading
____Teacher-child conferences for goal setting
____Guiding older children in tutoring younger children
____Guiding children toward self-directed prosocial behavior

____Wisconsin Design for Reading Skill Development (WDRSD, Design)

Check WDRSD area(s):

____Word Attack
____Study Skills
____Comprehension
____Self Directed, Interpretive, and Creative Reading

b. If there are any other commercially available products/programs for individualizing instruction that you would recommend highly to other schools implementing IGE, please list them and the relevant subject area below:

Subject Area | Name of Product/Program, Publisher

indicate changes in your address _____

Please return the questionnaire in the accompanying envelope.

Thanks!

APPENDIX B

FREQUENCY DISTRIBUTIONS OF STRATIFICATION VARIABLES
IN THE POPULATION (N=768)

Table B-1

STAFFORG RATING OF STAFF ORGANIZATION

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
.00	4	1	1	3.66	1	0	11	6.43	1	0	63
1.00	7	1	2	4.00	75	10	22	6.50	2	0	63
1.67	1	0	2	4.33	1	0	22	6.67	1	0	63
1.80	1	0	2	4.50	2	0	22	6.75	1	0	63
2.00	23	3	5	4.67	1	0	22	7.00	93	13	76
2.33	1	0	5	4.86	1	0	22	7.50	1	0	76
2.57	1	0	5	5.00	84	11	34	7.60	1	0	76
2.67	1	0	5	5.25	1	0	34	7.67	1	0	76
3.00	35	5	10	5.33	3	0	34	7.75	1	0	76
3.33	4	1	11	5.67	2	0	35	7.83	2	0	77
3.50	2	0	11	5.75	1	0	35	8.00	170	23	100
3.67	1	0	11	5.86	2	0	35				
3.83	1	0	11	6.00	201	27	63				

Table B-2

IGEAGE YEARS OF BEING AN IGE SCHOOL

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
1.	10	1	1	5.	184	24	63	9.	6	1	99
2.	42	5	7	6.	169	22	85	10.	1	0	100
3.	119	15	22	7.	81	11	96	11.	3	0	100
4.	131	17	39	8.	22	3	99				

Table B-3

IPMSCALE IMPLEMENTATION OF IPM

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
0.	144	19	19	12.	62	8	56	24.	23	3	94
2.	25	3	22	14.	7	1	57	26.	29	4	98
4.	7	1	23	16.	9	1	58	28.	17	2	100
6.	1	0	23	20.	181	24	82				
10.	187	25	48	22.	70	9	91				

Table B-4

FACIRANK RANK OF FACILITATIVE ENVIRONMENT

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
1.	36	5	5	3.	120	16	27	5.	146	19	64
2.	49	6	11	4.	138	18	45	6.	274	36	100

Table B-5

SCHOCLOR RATING OF SCHOOL ORGANIZATION

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
3.00	1	0	0	5.86	1	0	14	7.50	38	5	58
3.25	1	0	0	6.00	41	5	20	7.56	1	0	58
3.50	1	0	0	6.17	2	0	20	7.60	8	1	59
3.67	2	0	1	6.20	1	0	20	7.67	29	4	63
3.83	1	0	1	6.25	7	1	21	7.71	2	0	63
4.00	2	0	1	6.29	1	0	21	7.75	15	2	65
4.17	2	0	1	6.30	1	0	21	7.80	2	0	66
4.20	2	0	2	6.33	16	2	23	7.83	2	0	66
4.25	1	0	2	6.40	3	0	24	7.86	1	0	66
4.33	1	0	2	6.44	1	0	24	8.00	97	13	79
4.40	2	0	2	6.50	24	3	27	8.12	1	0	79
4.43	1	0	2	6.60	1	0	27	8.14	2	0	79
4.50	2	0	3	6.66	1	0	27	8.17	3	0	80
4.60	1	0	3	6.67	23	3	30	8.20	4	1	80
4.67	2	0	3	6.75	11	1	32	8.25	7	1	81
4.75	3	0	3	6.80	2	0	32	8.29	1	0	81
5.00	25	3	7	6.83	1	0	32	8.30	1	0	81
5.14	1	0	7	7.00	98	13	45	8.33	32	4	86
5.20	1	0	7	7.14	1	0	45	8.40	2	0	86
5.29	1	0	7	7.16	1	0	45	8.50	31	4	90
5.33	9	1	8	7.17	2	0	46	8.60	3	0	90
5.40	4	1	9	7.20	4	1	46	8.66	1	0	90
5.43	1	0	9	7.25	16	2	48	8.67	24	3	94
5.50	18	2	11	7.33	27	4	52	8.71	1	0	94
5.67	14	2	13	7.40	4	1	53	8.75	9	1	95
5.75	6	1	14	7.43	2	0	53	8.83	3	0	95
5.80	1	0	14	7.44	1	0	53	9.00	35	5	100

Table B-6

CURRPROD COMPOSITE CURRICULUM PRODUCT SCALE

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
0.	206	27	27	10.	214	28	71	20.	26	3	95
3.	116	15	42	13.	140	18	89	23.	26	3	99
6.	8	1	43	16.	24	3	92	26.	10	1	100

Table B-7

DEMOGSC COMPOSITE OF ZSCORES: DEMOGRAPHIC INFO

CATEGORY LABEL	CODE	ABSOLUTE FREQ.	RELATIVE FREQ (PCT)	ADJUSTED FREQ (PCT)	CUM FREQ (PCT)
	-1.86000	37	4.8	4.8	4.80
	-.93000	63	8.2	8.2	13.00
	.00000	615	80.1	80.1	93.10
	.93000	47	6.1	6.1	99.20
	1.86000	6	.8	.8	100.00
	TOTAL	768	100.0	100.0	

APPENDIX C

LOADINGS OF STRATIFICATION VARIABLES
ON PRINCIPAL COMPONENTS

Table C-1

FIRST STRATIFICATION DIMENSION (PRINCIPAL COMPONENT I)

Stratification Variables	Factor Loadings
Rating of Staff Organization	.58
Maturity of the Program (Years in IGE)	.54
Utilization of the Instructional Programming Model	.52
Rating for Facilitative Environment	.48
Rating of the Organization of Children in the School	.41
Use of R&D Center Curriculum Products	.36
Composite of Demographic Information	.24

Table C-2

SECOND STRATIFICATION DIMENSION (PRINCIPAL COMPONENT II)

Stratification Variables	Factor Loadings
Composite of Demographic Information	-.68
Rating of the Organization of Children in the School	.50
Maturity of the Program (Years in IGE)	-.49
Utilization of the Instructional Programming Model	.31
Use of R&D Center Curriculum Products	-.19
Rating of Staff Organization	.18
Rating for Facilitative Environment	.05

Table C-3

THIRD STRATIFICATION DIMENSION (PRINCIPAL COMPONENT III)

Stratification Variables	Factor Loadings
Use of R&D Center Curriculum Products	.85
Composite of Demographic Information	-.37
Rating of Staff Organization	-.23
Rating of the Organization of Children in the School	-.18
Rating for Facilitative Environment	.10
Maturity of the Program (Years in IGE)	-.09
Utilization of the Instructional Programming Model	-.02

Table C-4

FOURTH STRATIFICATION DIMENSION (PRINCIPAL COMPONENT IV)

Stratification Variables	Factor Loadings
Rating for Facilitative Environment	.83
Utilization of the Instructional Programming Model	-.40
Use of R&D Center Curriculum Products	-.18
Rating of Staff Organization	-.15
Composite of Demographic Information	-.06
Maturity of the Program (Years in IGE)	-.05
Rating of the Organization of Children in the school	.01

Table C-5

FIFTH STRATIFICATION DIMENSION (PRINCIPAL COMPONENT VI)

Stratification Variables	Factor Loadings
Utilization of the Instructional Programming Model	.67
Rating of the Organization of Children in the School	-.43
Rating of Staff Organization	-.28
Rating for Facilitative Environment	.24
Maturity of the Program (Years in IGE)	-.20
Use of R&D Center Curriculum Products	-.15
Composite of Demographic Information	.12

Table C-6

PRINCIPAL COMPONENT V (NOT USED AS A STRATIFICATION DIMENSION)

Stratification Variables	Factor Loadings
Rating of the Organization of Children in the School	.58
Rating of Staff Organization	-.52
Composite of Demographic Information	.44
Maturity of the Program (Years in IGE)	-.23
Use of R&D Center Curriculum Products	.16
Utilization of the Instructional Programming Model	.06
Rating for Facilitative Environment	-.03

Table C-7

PRINCIPAL COMPONENT VII (NOT USED AS A STRATIFICATION DIMENSION)

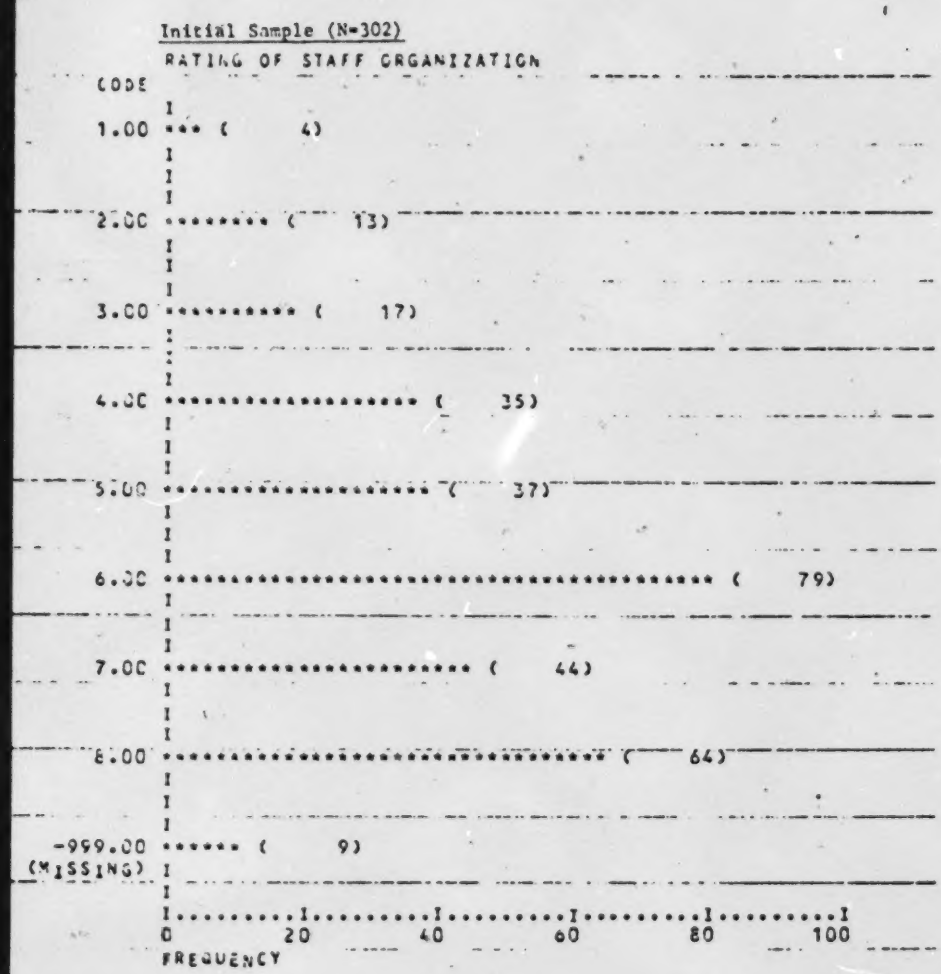
Stratification Variables	Factor Loadings
Maturity of the Program (Years in IGE)	-.61
Rating of Staff Organization	.46
Composite of Demographic Information	.36
Use of R&D Center Curriculum Products	.18
Rating of the Organization of Children in the School	-.13
Utilization of the Instructional Programming Model	-.12
Rating for Facilitative Environment	.05

APPENDIX D

HISTOGRAMS OF THE STRATIFICATION VARIABLES
IN THE INTENDED AND ACTUAL SAMPLES

Figure D-1

Rating of Staff Organization



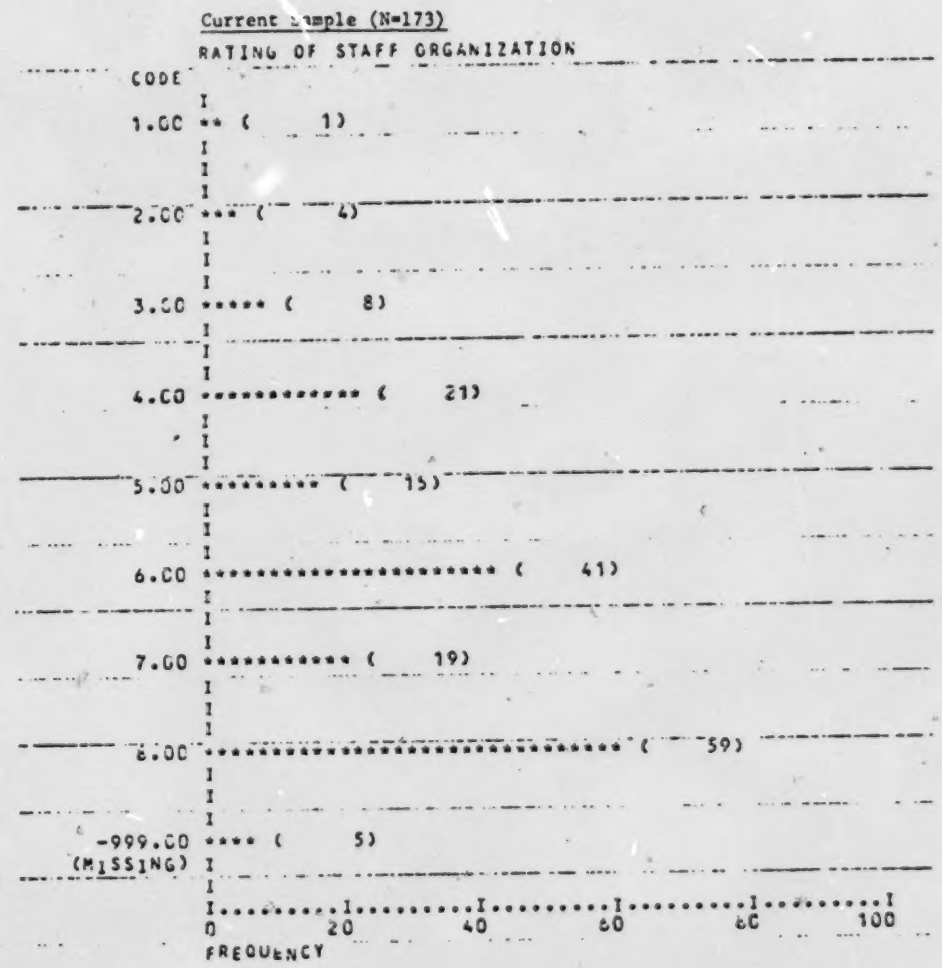


Figure D-2

Age of the Program

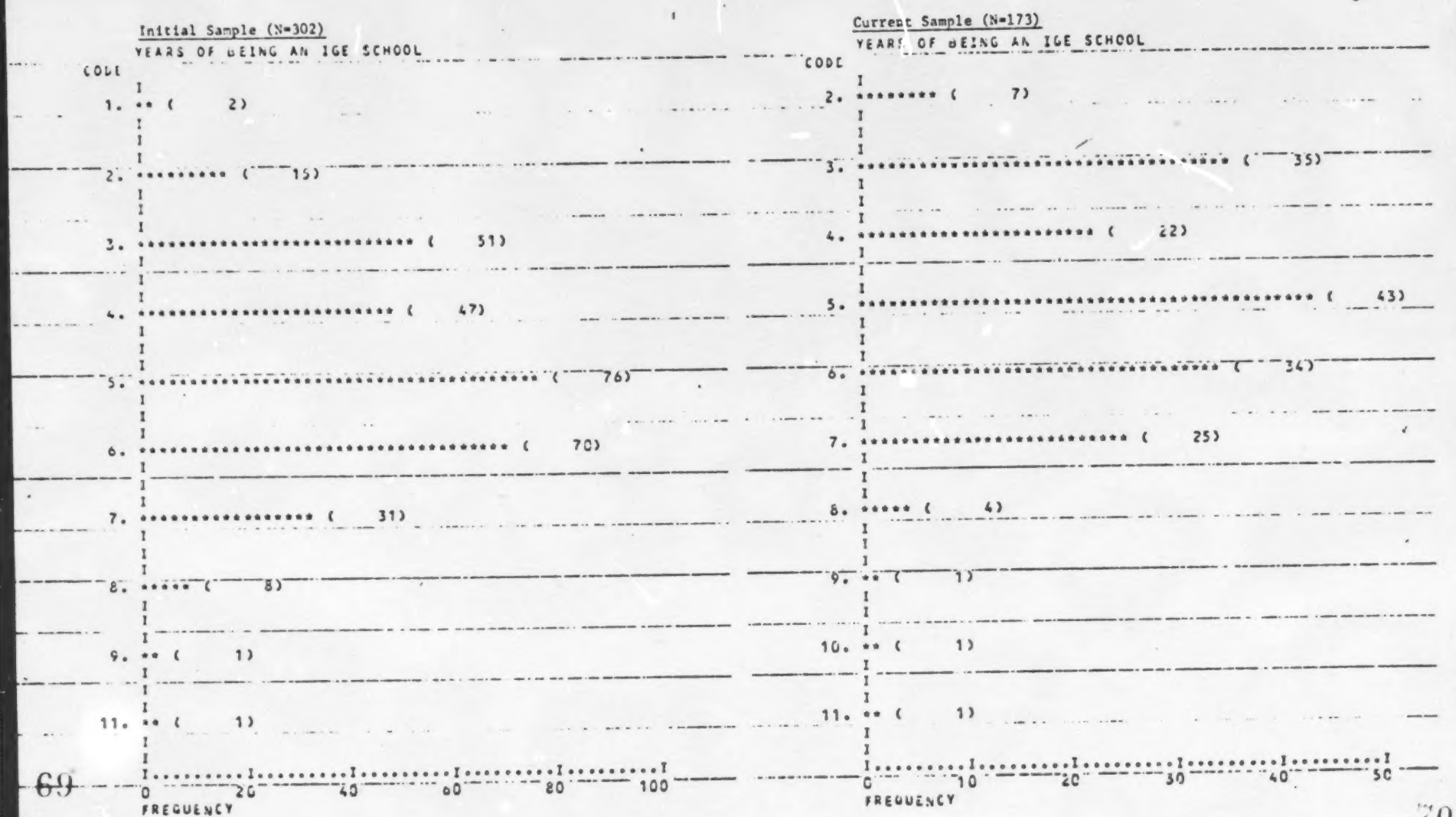
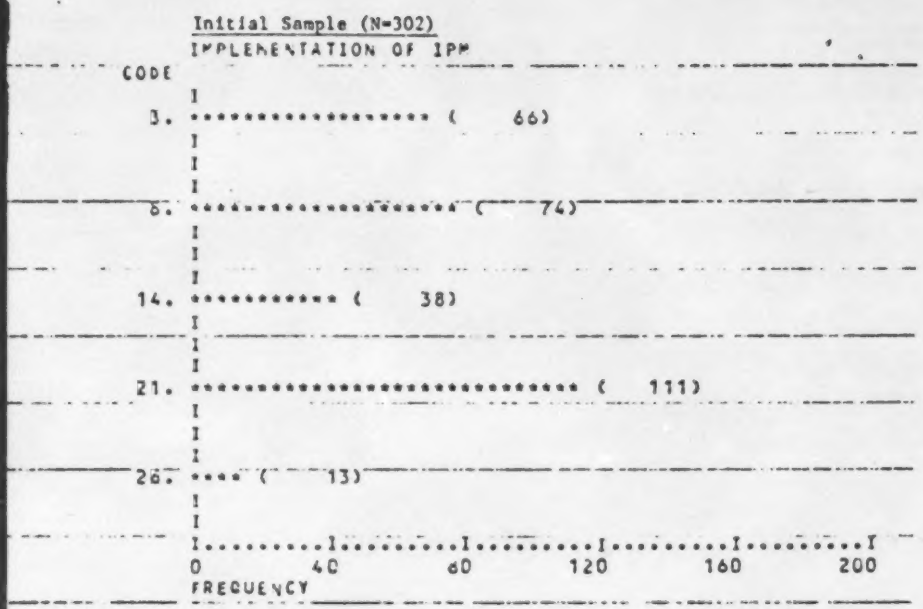


Figure D-3

Utilization of the Instructional Programming Model



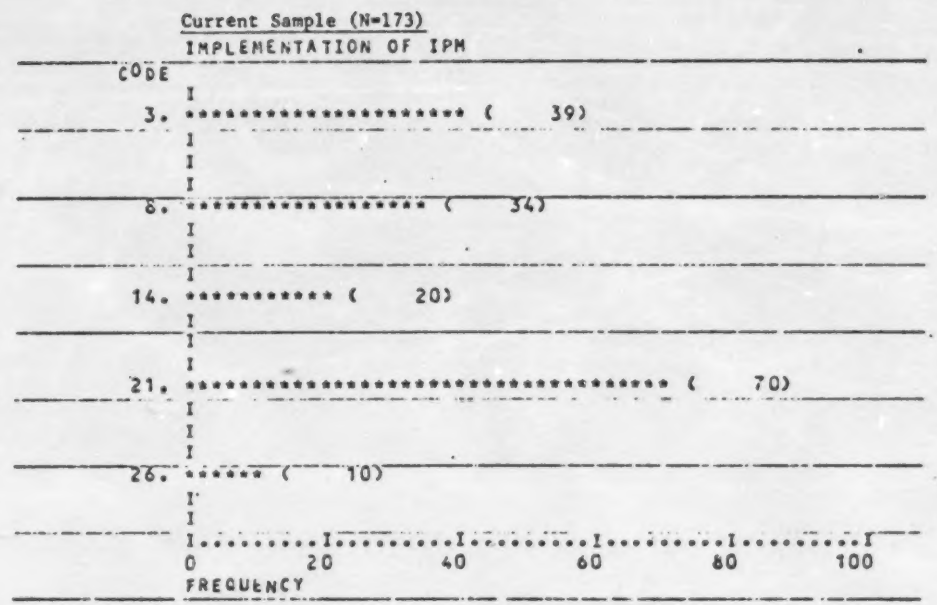


Figure D-4

Rating for Facilitative Environment

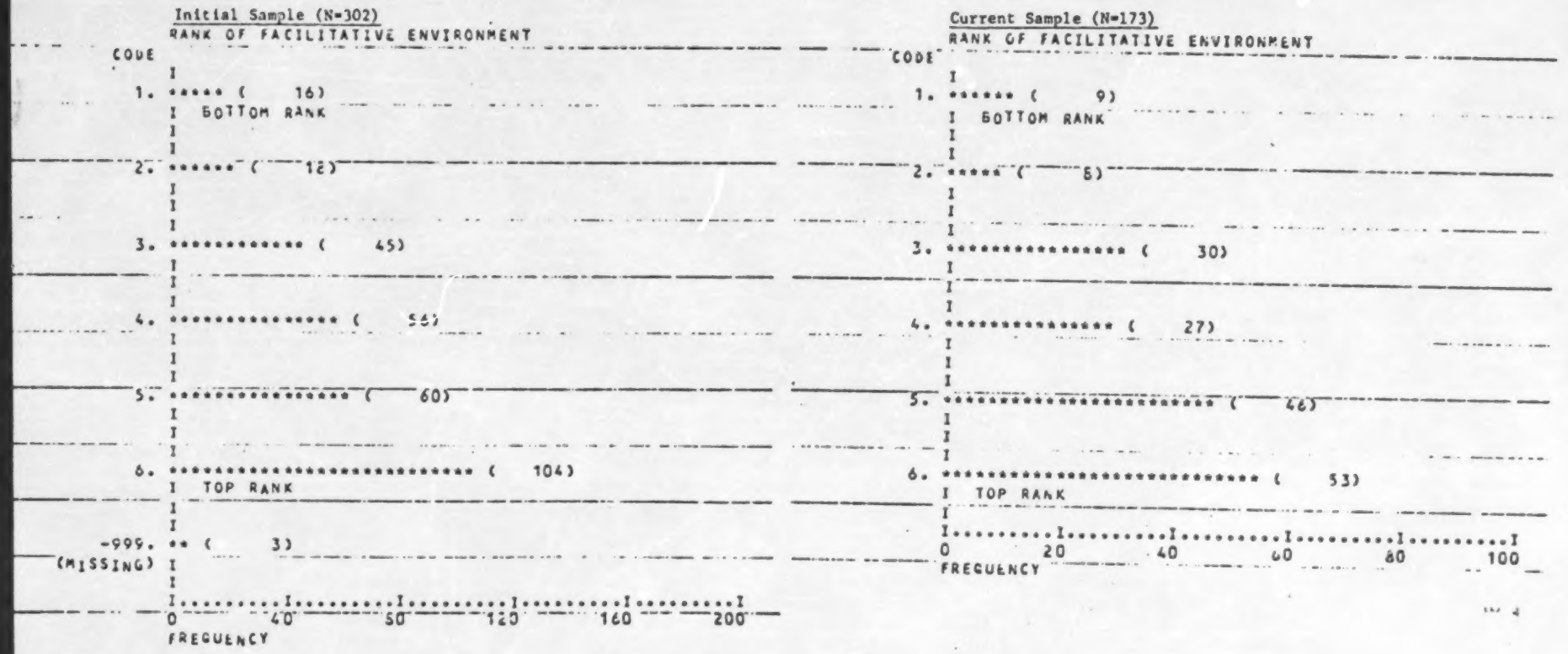
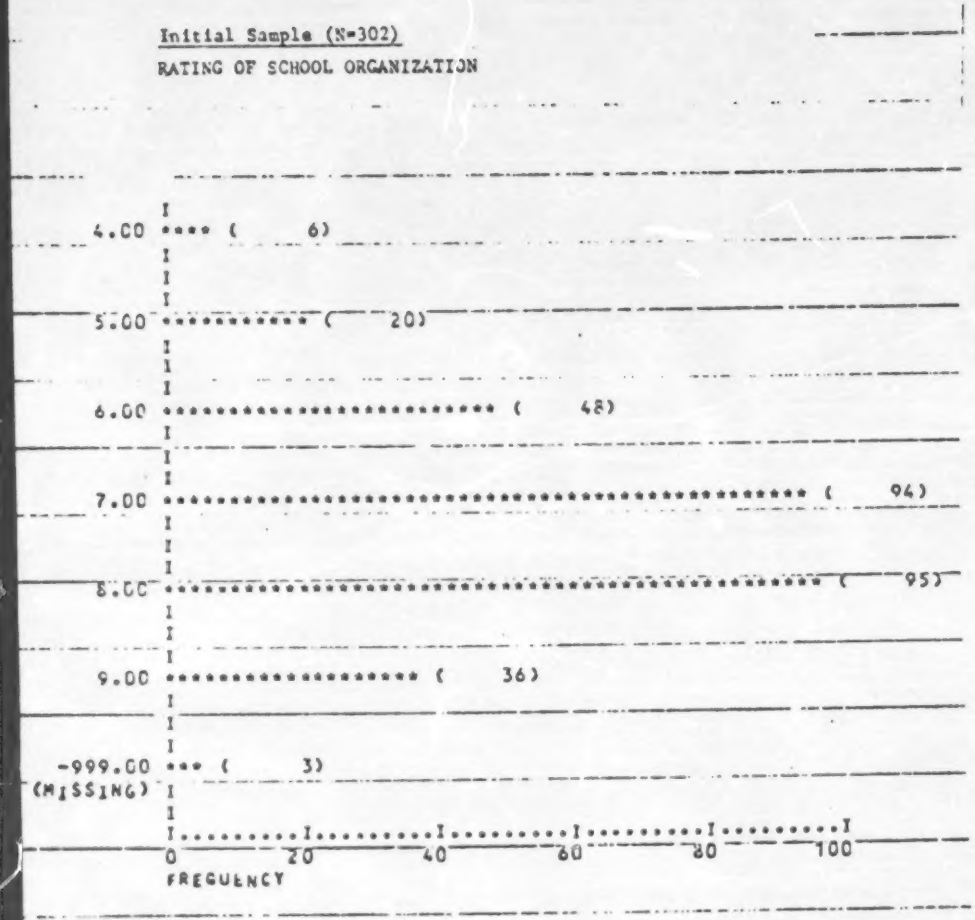


Figure D-5

Rating of the Organization of Children in the School



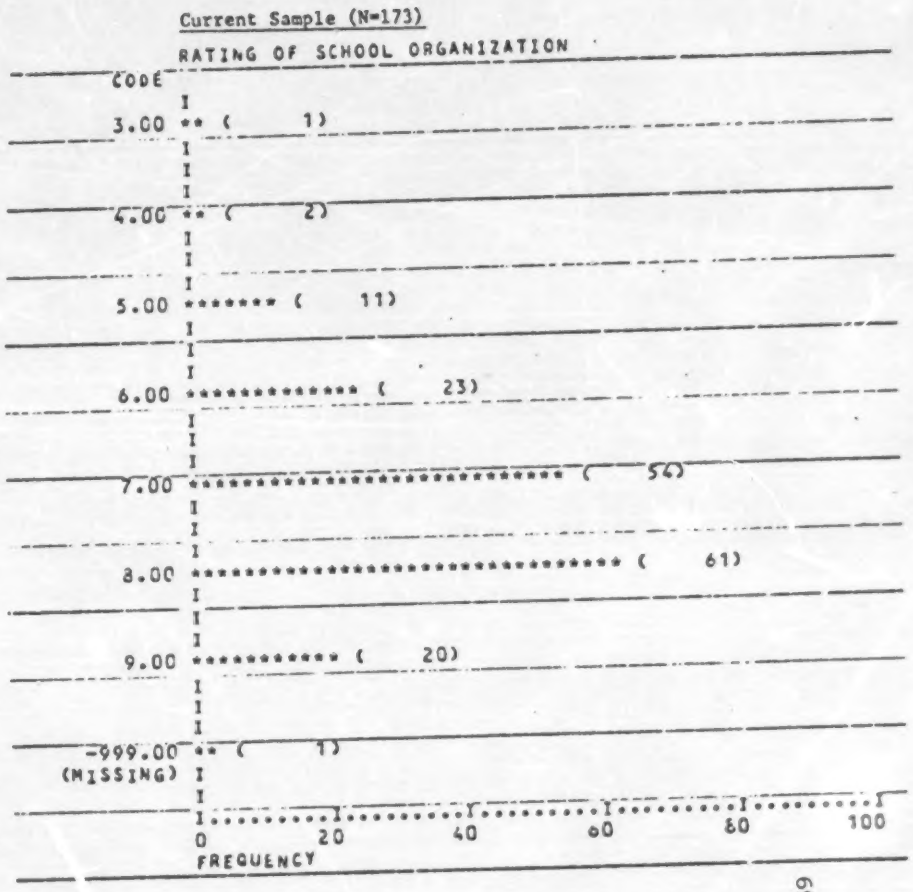


Figure D-6

Use of IPM-Compatible Curriculum Products

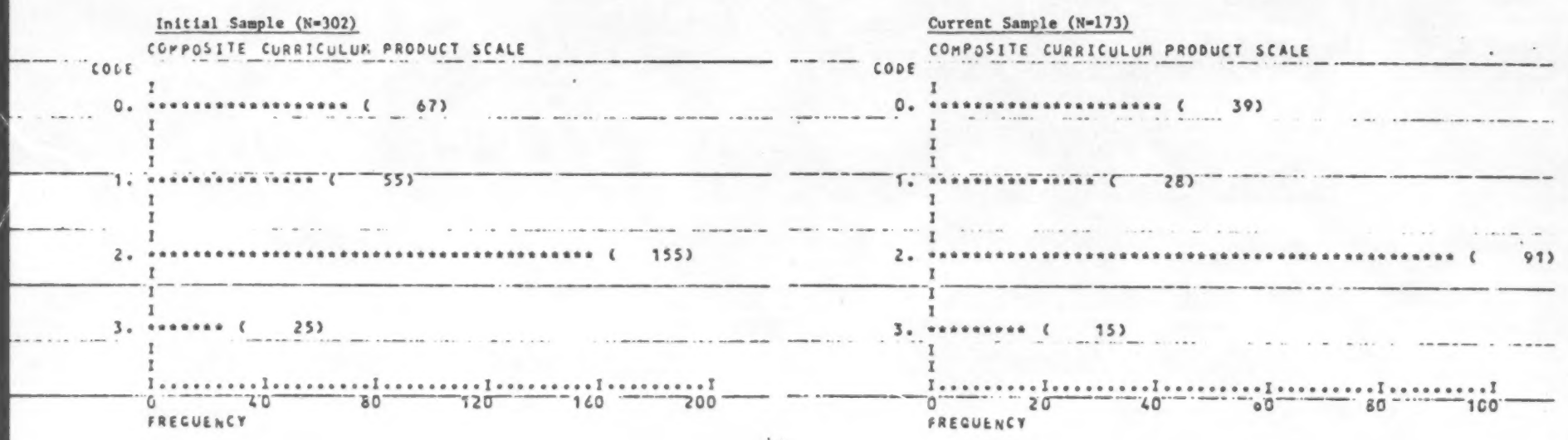
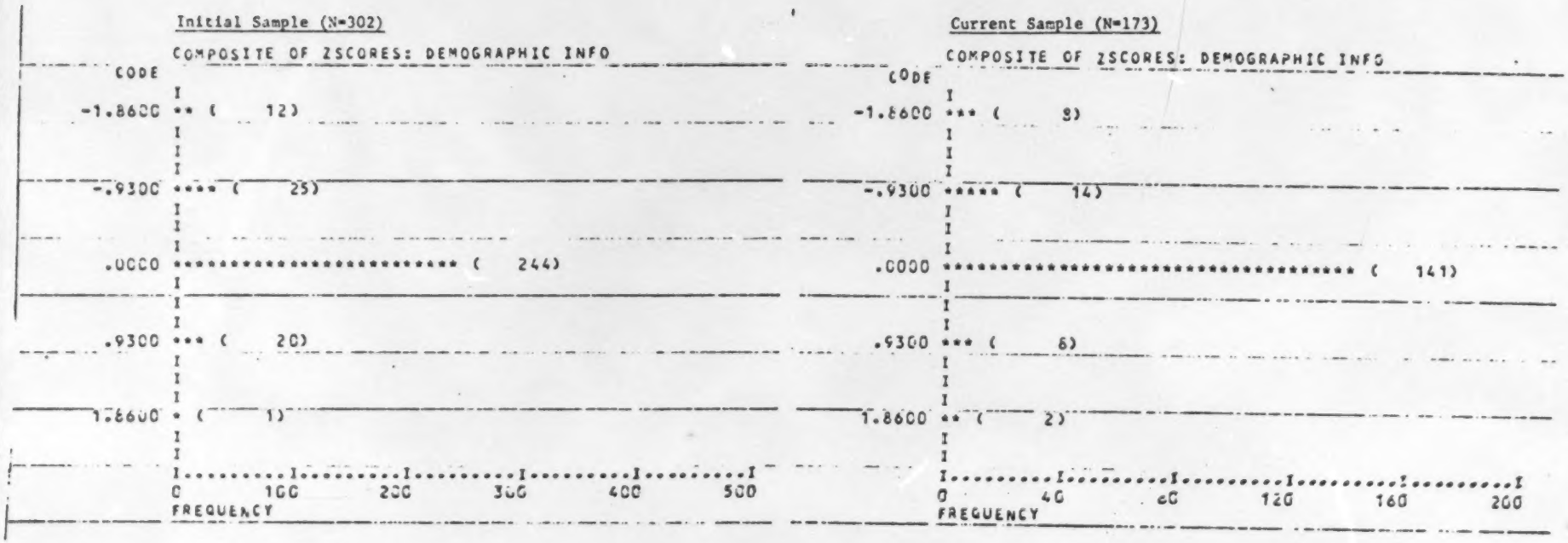


Figure D-7

Composite of Demographic Information



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